SPRING 2004

STANDARDS AND GUIDELINES

FOR

CONTAMINANTS IN MASSACHUSETTS DRINKING WATERS

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection
Office of Research and Standards
One Winter Street
Boston, MA 02108

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

MITT ROMNEY
Governor

KERRY HEALEY
Lieutenant Governor

ELLEN ROY HERZFELDER
Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

TO: Interested Parties

FROM: Carol Rowan West, Director, Office of Research and Standards

DATE: ***Spring 2004***

RE: Massachusetts Drinking Water Standards and Guidelines

Attached is the latest list of the Massachusetts Drinking Water Standards and Guidelines. The last issue was sent out in May of 2001.

There are numerous changes to the list from its last edition. Many are presentation changes to make our list consistent with how the United States Environmental Protection Agency (EPA) presents their federal drinking water standards. There is new guidance for a few contaminants and the guidance for several others has been updated to reflect new toxicity information or improved detection limits for specific contaminants.

For contaminant concentration limits for drinking water to be termed standards, or Massachusetts Maximum Contaminant Levels (MMCL) in Massachusetts, one of two events must occur. Either the promulgated EPA Maximum Contaminant Levels (MCLs) printed in the Federal Register must be formally adopted by the Drinking Water Program (DWP) at the Department of Environmental Protection (DEP) or the effective date listed in the Federal Register for the MCLs to be effective must have passed.

The standards and guidelines may not apply to all contaminant situations, so I urge you to continue to contact the Office of Research and Standards (ORS) with any questions regarding the application or interpretation of this information. Also, when a contaminant of interest is not on the list, please contact ORS for guidance (phone number 617-292-5998; email: michael.hutcheson@state.ma.us). The list can be accessed from the Massachusetts Department of Environmental Protection (MADEP) Web Page at http://www.mass.gov/dep/brp/dws/dwshome.htm

I. Introduction

The Drinking Water List of Standards and Guidelines is a convenient compendium of guidance values available for evaluating contaminants in drinking water in Massachusetts. The list is designed to be used by individuals or groups concerned with the integrity of drinking water, for example, water suppliers, homeowners, environmental groups, government regulators, boards of health, or private consultants.

Under the Safe Drinking Water Act (SDWA), a State may be granted primacy for implementing the provisions of the SDWA. Massachusetts DEP has primacy for implementation. As part of that primacy, MADEP is responsible for ensuring the quality of Massachusetts public drinking waters.

The Office of Research and Standards is charged with establishing protective public health standards and/or guidelines for contaminants in drinking water. This mission may involve adoption or revision of standards established by the EPA, or ORS may adopt a more stringent standard or guideline based on an independent review of primary or secondary data.

II. Standards

The Massachusetts MCLs listed in 310 CMR 22.00 of the drinking water regulations, as well as the promulgated MCLs set by the EPA which have become effective, constitute the Massachusetts Drinking Water Standards, which are listed as MMCLs on the Drinking Water List. The standards are enforced by the Drinking Water Program (DWP). The drinking water regulations have been updated to reflect the latest changes in the drinking water standards. The regulations were last promulgated in April 2004.

The MMCLs listed in 310 CMR 22.00 apply to water that is delivered to any user of a public water system as defined in 310 CMR 22.02. Please refer to the regulations for more specific definitions and applications. Private residential wells are not subject to the requirements of 310 CMR 22.00. However, these drinking water standards are recommended for the evaluation of private drinking water and are often used to evaluate private residential contamination, especially in Federal Superfund and M.G.L Chapter 21E activities.

III. Guidelines

The Office of Research and Standards of the MADEP issues guidance for chemicals other than those with Massachusetts MCLs in drinking water. Standards promulgated by the EPA but not yet effective may be included on the Guidelines list.

ORS derives guidelines and recommends or revises EPA Health Advisories (HA; available at http://www.epa.gov/ost/drinking/standards/dwstandards.pdf) and Proposed Maximum Contaminant Levels (PMCLs) after review and evaluation of all available data for a particular contaminant. All new health advisory guidelines are evaluated on an ongoing, case-by-case basis and may be incorporated into the list.

ORS uses methodology similar to that used by the EPA's Office of Water (OW) when setting guidelines for chemicals in drinking water. Concentrations of chemicals having evidence of carcinogenicity are minimized as much as feasible, therefore, guidelines are set at a target risk of one in one million or the lowest practical quantitation limit (PQL) for EPA classified group A or B carcinogens. Class C carcinogens are individually evaluated for a decision regarding whether to set the guidelines on cancer effects.

To derive guidance for potential non-carcinogenic effects for a chemical, ORS applies a percentage (usually 20%) to published or derived route-specific reference doses and then uses standard exposure assumptions to convert the dose to a drinking water concentration. This practice allows for the possibility of human exposures from sources other than drinking water.

The standards and guidelines published in this list are derived for the specific circumstances associated with drinking water. The assumptions used in establishing the numbers are therefore specific to drinking water situations and discretion must be exercised when using the guidance for situations other than contaminated drinking water. Please refer any questions regarding the proper use of the numbers issued in this list to the Office of Research and Standards at 617-292-5998.

A more detailed description of the methodology used by ORS to derive water guidance can be found in Guide to the Regulation of Toxic Chemicals In Massachusetts Waters (ORS 1990), available soon on MADEP's website at: http://www.mass.gov/dep/ors/orspubs.htm.

IV. Spring 2004 Drinking Water Standards and Guidelines Lists Update

Additions and changes follow on next page:

Contaminant	Change or Addition	Description of Change	Basis for Change or Addition
1,3-Dichloropropene	change	Last guideline value changed to 0.0004 mg/L from 0.0005 mg/L	The toxicological basis of the old guideline was dated by the most recent assessments of 1,3-dichloropropene's toxicity available in IRIS. Concentration associated with Drinking Water Program's target excess lifetime cancer risk of one in a million is 0.0004 mg/L This change will bring MADEP current with U.S. EPA guidance.
1,4-Dioxane	change	Last guideline value changed to 0.003 mg/L from 0.05 mg/L	The last value listed for 1,4-dioxane was based upon the PQL. Analytical detection capabilities have improved in recent years, allowing measurement down to 0.001 mg/L (U.S. EPA, 2003). The recommended guideline of 0.003 mg/L is associated with the Drinking Water Program's target excess lifetime cancer risk of one in one million.
Acetone	change	Last guideline value changed to 6.3 mg/L from 3 mg/L	Change reflects latest IRIS chronic oral reference dose. Old value was based upon a 1993 value.
Arsenic	change	Footnote added that old still-listed standard of 0.05 mg/L will become 0.01 mg/L as of 1/23/06	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html. EPA promulgated new standard of 0.01 mg/L in January 2001 which was followed by implementation guidance in August 2002.
Bromate	addition	Added new MMCL of 0.010 mg/L for this compound	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Chloramines (as Cl_2)	addition	Show as MRDL* = 4.0 mg/L	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Chlorine (as Cl_2)	addition	Show as MRDL* = 4.0 mg/L	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Chlorite	addition	Added new MMCL of 1.0 mg/L for this compound	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Chlorine dioxide (as ClO_2)	addition	Show as MRDL* = 0.8 mg/L	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Chloroform	change	Last guideline value changed to 0.07 mg/L from 0.005 mg/L	This guideline is for non-chlorinated supplies and reflects EPA's latest assessment of the toxicity of chloroform using the latest EPA Cancer Risk Assessment guidelines.
Coliform bacteria	change	Language added to "Coliform Bacteria"	Substance will be listed as "Total Coliform Bacteria (including fecal coliform and "*E. coli*") to conform with U.S. EPA wording.

Contaminant	Change or Addition	Description of Change	Basis for Change or Addition
Copper	change	" Treatment Technique" added to noted Action Level	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Cryptosporidium	addition	Show MMCL as treatment technique	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html.
Cyanide	change	"(as free cyanide)" added after chemical name	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Giardia lamblia	addition	Show MMCL as treatment technique	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Haloacetic acids (HAA5)	addition	Added new MMCL of 0.060 mg/L for this group of compounds	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html. A new standard for this group of compounds which are byproducts of the disinfection process (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, bromoacetic acid and dibromoacetic acid) was issued in 1998 and the last effective date for phase- in was January 1, 2004.
Heterotrophic plate count	addition	Show MMCL as treatment technique	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Lead	change	" Treatment Technique" added to noted Action Level	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Legionella	addition	Show MMCL as treatment technique	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Mercury	change	Added "(inorganic)" after mercury in list	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Methyl ethyl ketone	change	Last guideline value changed to 4.0 mg/L from 0.35 mg/L	This change will reflect the current IRIS toxicity value for this chemical. Old value no longer supportable.
n-Nitrosodimethyl amine	addition	Listed under "Guidelines"; PQL-based value of 0.00001 mg/L	New guideline developed for Bureau of Waste Site Cleanup (BWSC) using ORS' determination of best toxicity guidance available from U.S. EPA, CA and Canada.

Contaminant	Change or Addition	Description of Change	Basis for Change or Addition
Perchlorate	addition	Included under "Guidelines"; notation of 0.001 mg/L footnoted as "Interim" for sensitive subgroups	MADEP has developed interim guidance for perchlorate exposures for those sensitive subgroups particularly at risk from perchlorate exposures. Updates to this guidance are likely before the List of Standards and Guidelines is next updated so readers are urged to consult MADEP's web page for this timely information.
Petroleum hydrocarbon fractions	change	See table for details	The toxicity values supporting the drinking water guidelines for the petroleum hydrocarbon fractions have been recently updated by ORS for the Bureau of Waste Site Cleanup. These toxicity values have undergone per review by the MADEP/MADPH** Health Effects Advisory Committee and BWSC's Numerical Standards Workgroup. Supporting documentation is available at: http://www.mass.gov/dep/bwsc/vph_eph.htm
Total trihalomethanes (TTHMs)	change	Replaced with new MMCL of 0.080 mg/L.	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html. The new MMCL for total trihalomethanes (t-THM) in public drinking is 0.08 mg/l and includes four THMs (chloroform, bromodichloromethane, dibromochloromethane, and bromoform). The final rule for total trihalomethanes was issued on December 16, 1998 and the last effective date for phase-in was January 1, 2004.
Turbidity	change	Show MMCL as treatment technique	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html
Uranium	addition	Show new MMCL as 0.03 mg/L which became effective 12/08/03.	Remove notation for uranium from old guideline list and associated footnote. Decision made 6/27/02 at MADEP Safe Drinking Water Act Advisory Committee to use EPA's 0.03 mg/L standard.
Viruses (enteric)	addition	Show MMCL as treatment technique	Bring into line with Federal Listing of Standards: http://www.epa.gov/safewater/mcl.html

* MRDL = maximum residual disinfectant level

**MADPH = Massachusetts Department of Public Health

V. References

1. MADEP. 1994. Interim Final Petroleum Report: Development of a Health-based Alternative to the Total Petroleum Hydrocarbon (TPH) Parameter. Massachusetts Department of Environmental Protection, Bureau of Waste Site Cleanup.

2. MADEP. 1998. Methods for the Determination of Volatile Petroleum Hydrocarbons and Extractable Petroleum Hydrocarbons, Division of Environmental Analysis, Wall Experiment Station.

3. Office of Research and Standards, 1990. *Guide to the Regulation of Toxic Chemicals in Massachusetts Waters*. Department of Environmental Protection. Boston, MA.

4. U.S. Environmental Protection Agency. 2003. Standard Operating Procedure for Measurement of Purgeable 1,4-dioxane in water by GC/MS. EIASOP-VOADIOX1). Office of Environmental Measurement and Evaluation, EPA Region New England. North Chelmsford, MA

SUBSTANCE	CASRN	MMCL (mg/l)
Acrylamide⊕	79061	Treatment Technique
Alachlor	15972608	0.002
Antimony	7440360	0.006
Arsenic⁾(	7440382	0.05
Asbestos¥	1332214	7 million fibers/liter
Atrazine	1912249	0.003
Barium	7440393	2
Benzene	71432	0.005
Benzo(a)pyrene	50328	0.0002
Beryllium	7440417	0.004
Bromate	15541454	0.010
Cadmium	7440439	0.005
Carbofuran	1563662	0.04
Carbon Tetrachloride	56235	0.005
Chloramines (as Cl_2)	-	4.0 (MRDL*)
Chlordane	57749	0.002
Chlorine (as Cl_2)	7782505	4.0 (MRDL)
Chlorine dioxide (as ClO_2)	10049044	0.8 (MRDL)
Chlorite	7758192	1.0
Chlorobenzene	108907	0.1
Chromium (total)	7440473	0.1
Copper	7440508	Treatment Technique, 1.3 (Action Level)
Cryptosporidium	N/A	Treatment Technique
Cyanide (as free cyanide)	57125	0.2
2,4-D (2,4-Dichlorophenoxyacetic acid)	94757	0.07
Dalapon	75990	0.2

(cont'd)

SUBSTANCE	CASRN	MMCL (mg/l)
1,2-Dibromo-3-chloropropane (DBCP)	96128	0.0002
1,2-Dichlorobenzene (o-DCB)	95501	0.6
1,4-Dichlorobenzene (p-DCB)	106467	0.005
1,2-Dichloroethane	107062	0.005
1,1-Dichloroethylene	75354	0.007
1,2-Dichloroethylene(*cis*)	156592	0.07
1,2-Dichloroethylene(*trans*)	156605	0.1
Dichloromethane	75092	0.005
1,2-Dichloropropane	78875	0.005
Di(2-ethylhexyl)-adipate	103231	0.4
Di(2-ethylhexyl)-phthalate	117817	0.006
Dinoseb	88857	0.007
Diquat	85007	0.02
Endothall	145733	0.1
Endrin	72208	0.002
Epichlorohydrin⊕	106898	Treatment Technique
Ethylbenzene	100414	0.7
Ethylene Dibromide (EDB)	106934	0.00002
Fluoride	7782414	4.0
Giardia lamblia	N/A	Treatment Technique
Glyphosate	1071536	0.7
Haloacetic acids (HAA5) (for chlorinated supplies only): including monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, bromoacetic acid and dibromoacetic acid	N/A	0.060

(cont'd)

SUBSTANCE	**CASRN**	**MMCL (mg/l)**
Heptachlor	76448	0.0004
Heptachlor Epoxide	1024573	0.0002
Heterotrophic plate count	N/A	Treatment Technique
Hexachlorobenzene	118741	0.001
Hexachlorocyclopentadiene	77474	0.05
Lead	7439921	Treatment Technique, 0.015 (Action Level)
Legionella	N/A	Treatment Technique
Lindane	58899	0.0002
Mercury (inorganic)	7439976	0.002
Methoxychlor	72435	0.04
Nitrate (As N)	14797558	10
Nitrate/Nitrite (total)	N/A	10
Nitrite (As N)	14797650	1
Oxamyl (Vydate)	23135220	0.2
PCBs (Polychlorinated Biphenyls)	1336363	0.0005
Pentachlorophenol	87865	0.001
Picloram	1918021	0.5
Selenium	7782492	0.05
Simazine	122349	0.004
Styrene	100425	0.1
2,3,7,8-TCDD (Dioxin)	1746016	3×10^{-8}
Tetrachloroethylene	127184	0.005
Thallium	7440280	0.002
Toluene	108883	1

(cont'd)

SUBSTANCE	CASRN	MMCL (mg/l)
Total Trihalomethanes (for chlorinated supplies only)	N/A	0.08
Including: Chloroform	67663	N/A
Chlorodibromomethane	124481	N/A
Bromodichloromethane	75274	N/A
Bromoform	75252	N/A
Toxaphene	8001352	0.003
2,4,5-TP (Silvex)	93721	0.05
1,2,4-Trichlorobenzene	120821	0.07
1,1,1-Trichloroethane	71556	0.2
1,1,2-Trichloroethane	79005	0.005
Trichloroethylene	79016	0.005
Turbidity	N/A	Treatment Technique
Uranium	7440611	0.03
Vinyl Chloride	75014	0.002
Viruses (enteric)	N/A	Treatment Technique
Xylenes (total)	1330207	10
Total Coliform Bacteria (including fecal coliform and *E. coli*)	N/A	refer to 310 CMR 22.05
Radium (226 + 228)	7440144	5 pCi/l
Gross Alpha Radiation	N/A	15 pCi/l
Beta Particle and Photon Radioactivity	N/A	concentration which produces an annual dose of 4 millirem/yr

♓ The MCL for arsenic was changed in 2001 and will become effective at 0.01 mg/L as of 1/23/06 following Implementation Guidance issued in August 2002.

⊕ No numerical MCL is provided for these compounds. If detected, a treatment technique is specified.

¥ For fibers longer than 10 microns.

N/A Not applicable

* MRDL = maximum residual disinfectant level - the highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

SUBSTANCE	CASRN	ORSG (mg/l)
Acetone	67641	6.3
Aldicarb[Ν]	116063	0.003
Aldicarb Sulfone[Ν]	1646884	0.002
Aldicarb Sulfoxide[Ν]	1646873	0.004
Bromomethane	74839	0.01
Chloroform**	67663	0.07
Dichlorodifluoromethane	75718	1.4
1,1-Dichloroethane	75343	0.07
1,3-Dichloropropene	542756	0.0004
1,4-Dioxane	123911	0.003
Ethylene Glycol	107211	14
Methyl Ethyl Ketone	78933	4.0
Methyl Isobutyl Ketone	108101	0.35
Methyl Tertiary Butyl Ether[Ξ]	1634044	0.07
Metolachlor	51218452	0.1
Naphthalene	91203	0.140
Nickel[Ω]	7440020	0.1
n-Nitrosodimethylamine (NDMA)	62759	0.00001
Perchlorate*	Various CASRN numbers for different chemical species	0.001
Petroleum Hydrocarbons ℘	N/A	
TPH		0.2
Aliphatics		
C5-C8		0.3
C9-C12[Φ]		0.7
C9-C18[Φ]		0.7
C19-C36		14.0
Aromatics		
C_6-C_8		use guidance for individual chemicals
C9-C10		0.2
C11-C22		0.2

(cont'd.)

SUBSTANCE	CASRN	ORSG (mg/l)
Radon-222$^{\propto}$	14859677	10,000
Sodium$^{\Lambda}$	7440235	20
Tetrahydrofuran	109999	1.3
1,1,2-Trichloro1,2,2-trifluoroethane (FREON 113)	76131	210

All guidelines are current with the information listed in IRIS as of February 2004, except where noted.

ℵ The MCLs for aldicarb, aldicarb sulfone and aldicarb sulfoxide have been stayed.

℘ Monitoring for these compounds is not required but is done on a case-by-case basis. These limits may be used when evaluating health risks posed by clearly identified mixtures of petroleum hydrocarbon compounds. The analytical methods to use to generate data to compare to the Drinking Water Guidelines are the Volatile Petroleum Hydrocarbon (VPH) and the Extractable Petroleum Hydrocarbon (EPH) methods developed by the MADEP (MADEP 1998).

Φ The overlap in the C9-C12 range is the result of the VPH and EPH analytical methods used to quantitate these ranges of petroleum hydrocarbons in drinking water. The choice of the most appropriate range to use is based on the identity of the petroleum product of concern and is therefore determined on a case-specific basis.

** This guideline applies to non-chlorinated water supplies. For chlorinated drinking water supplies, please contact the Drinking Water Program.

Ω The MCL for Nickel has been remanded and is no longer in effect, however the current EPA IRIS chronic oral reference dose for soluble salts of nickel (http://www.epa.gov/iris/subst/0271.htm) supports this value and it is also the currently listed EPA Life-time Health Advisory value (http://www.epa.gov/ost/drinking/standards/dwstandards.pdf).

∝ Exceedance of this guideline indicates that air sampling for Radon-222 should be done. EPA proposed new guidelines for radon (64 FR 211; Tuesday, November 2, 1999)

Λ All detections of sodium must be reported. Please refer to 310 CMR 22.06A for the specific requirements. The sodium guideline of 20 mg/l is based on an eight (8) ounce serving.

Ξ The health-based guideline for MTBE was reviewed by ORS in 2000.

* This interim guidance is directed at the sensitive subgroups of pregnant women, infants, children up to the age of 12, and individuals with hypothyroidism. They should not consume drinking water containing concentrations of perchlorate exceeding 1 ppb. MA DEP recommends that no one consume water containing perchlorate concentrations greater than 18 ppb. **Check MADEP's website for anticipated updates to this guidance in the coming year.**

SECONDARY MAXIMUM CONTAMINANT LEVELS

Chemicals/Parameter	Status	SMCL (mg/l)
Aluminum	F	0.05 to 0.2
Chloride	F	250
Color	F	15 Color Units
Copper	F	1
Corrosivity	F	non-corrosive
Fluoride	F	2
Foaming Agents	F	0.5
Iron	F	0.3
Manganese	F	0.05
Methyl Tertiary Butyl Ether$^{\nabla}$	A	0.020-0.040
Odor	F	3 threshold odor numbers
pH	F	6.5 - 8.5
Silver	F	0.10
Sulfate	F	250*
Total dissolved solids (TDS)	F	500
Zinc	F	5

F- Final
A- Advisory
* An MCL of 500 mg/l has been proposed by USEPA (Federal Register 12/20/94).
∇ The secondary MCL for MTBE is based on the Drinking Water Advisory set by EPA and is based on taste and odor considerations.

Secondary Standards are referenced in the Massachusetts Drinking Water Regulations (310 CMR 22.07 (d)).

GLOSSARY

Absorbed Dose: the amount of a chemical that enters the systemic circulation of an organism.

Absorption: The uptake of chemicals from any physiological surface into another physiological space, e.g., the movement of a chemical from the stomach into the general circulation.

Acute Exposure: An exposure which lasts for a period of time less than or equal to twenty-four hours.

Action Level: The level at which if more than ten percent of tap water samples exceed this level, water systems must take additional steps beyond the required treatment technique.

Ambient: Environmental or surrounding conditions.

Bioaccumulation: The retention and concentration of a substance by an organism.

CASRN: Chemical Abstract Service Registry Number. Each chemical is assigned a unique number for cataloging purposes.

Chronic Exposure: In animals, multiple exposures for a period of time greater than three months. In humans, the time period is seven years or greater.

CMR: Code of Massachusetts Regulations. These are regulations of the Commonwealth of Massachusetts, promulgated by administrative agencies of the Commonwealth, outlining the rules of conduct for specific agencies.

Dose: The quantity of a chemical to which an organism is exposed.

Dose-Response Relationship: The quantitative relationship between the exposure to a chemical and the degree of biological effects.

ELCR: Excess Lifetime Cancer Risk. This refers to the estimate of the probability that exposure to chemicals, under specific conditions, will result in cancer above natural background cancer rates.

Hazard Index: The ratio of the average daily dose of a chemical in mg/kg/d, to its reference dose in mg/kg/d.

Inorganic Chemicals: Chemicals which do not contain the carbon atom.

IRIS: Integrated Risk Information System. This is a database of toxicity information and regulatory levels, maintained by the U.S. EPA.

LC50 : The concentration of a chemical in air or water which causes death in 50 % of the test organisms in a given study. This value is not a constant.

LD50 : The dose of a chemical taken by mouth or absorbed by the skin which causes death in 50 % of the test organisms in a given study. This value is not a constant.

LOAEL: Lowest Observed Adverse Effects Level. The lowest dose of a chemical in a study or group of studies that produces a statistically or biologically significant increase in the frequency or severity of adverse effects between an exposed population and a control group.

MCL: Maximum Contaminant Level. This is a value, established by the EPA, which represents the acceptable level of a contaminant in drinking water under specified conditions. Cost and feasibility are taken into consideration when deriving the MCL as well as health considerations.

MDL: Method Detection Limit. This is the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

MMCL: Massachusetts Maximum Contaminant Level. This is a drinking water standard promulgated in the Drinking Water Regulations (310 CMR 22.00) issued by the Drinking Water Program of the MADEP.

MRDL: Maximum residual disinfectant level - the highest level of a disinfectant allowed in drinking water.

NOAEL: No Observed Adverse Effect Level. This is a dose of a chemical at which there were no statistically or biologically significant increases in the frequency or severity of adverse effects seen between the exposed population and its appropriate control group.

Organic Chemicals: Chemicals which contain the carbon atom.

ORSG: Office of Research and Standards Guideline. This is the concentration of a chemical in drinking water, at or below which, adverse, non-cancer health effects are unlikely to occur after chronic (lifetime) exposure. In addition, this concentration generally has an associated excess lifetime cancer risk of less than or equal to one in one million for chemicals that act as carcinogens. The guidelines are intended to provide an adequate margin of safety for threshold-type effects and a low cancer risk. The numbers, when exceeded, would not necessarily result in non-cancer adverse health effects but serve as indicators of the potential need for further action to be decided by the Drinking Water Program.

PQL: Practical Quantitation Limit. This refers to the lowest concentrations of analytes in specific media that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions.

Reference Dose (RfD): The RfD is an estimate, with uncertainty spanning perhaps an order of magnitude, of a daily exposure to the human population (including sensitive subgroups) that is likely to be without deleterious health effects during a 70 year lifetime.

Route of Exposure: The pathway by which a chemical comes in contact with an organism (e.g., ingestion, inhalation, dermal contact, injection).

SMCL: Secondary Maximum Contaminant Level. These standards are developed to protect the aesthetic qualities of drinking water and are not health based and are not legally enforceable.

Subacute Exposure: In animals, it is a period of exposure less than or equal to thirty days. In humans, it is a period of time less than or equal to fourteen days.

Subchronic Exposure: In animals, it is a period of exposure of at least thirty days but less than 90 days. In humans, it is an exposure period of greater than two weeks but less than seven years.

Threshold Dose: The lowest dose of a chemical at which a specified measurable effect is observed.

Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.